METHODS AND APPARATUS FOR BROADCASTING MESSAGES FOR RECEIPT BY SPECIFIC RECIPIENTS IN A NETWORK

BACKGROUND OF THE INVENTION

The present invention relates generally to message delivery in a network. More
5   specifically, the invention relates to the delivery of broadcast messages to a particular sub-population of receivers in a network. In particular, the invention provides methods and systems for limiting the receipt of broadcast messages to a specific population of set-top terminals in a television system.

In a typical cable television system, the messages sent to a set-top terminal may
10   be divided into three categories, a unit addressed message, a multicast message, and a broadcast message. A unit addressed message is a message addressed to a specific set-top terminal. Unit addressed messages may contain, for example, authorization information for a specific set of services ordered by a user. A multicast message is a message addressed to a specific population of set-top terminals in the cable system. A
15   multicast message may be a message meant for all set-top terminals associated with a particular headend in a cable television system, and may provide, for example, a channel map for those set-top terminals. A broadcast message is a message addressed to every set-top terminal in the system, regardless of the headend the terminal is associated with. Broadcast messages may contain, for example, any information shared among all
20   terminals in a system.

Certain set-top terminals, such as the Bootloader terminal developed by General Instrument Corporation, the assignee of the present invention, cannot receive a multicast message. The Bootloader terminal is provided at manufacture only with a download platform and the ability to receive broadcast messages. The Bootloader terminal can be
25   initialized and configured once installed in the field. This simplifies the manufacturing process and allows the same set-top terminal to be used in virtually any cable or satellite television system. Once installed, the particular configuration information needed for

the terminal to operate in that television system is downloaded by the terminal. The Bootloader terminal is described in detail in co-pending commonly assigned U.S. patent application number 09/544,447 entitled "Method and System for Identifying and Downloading Appropriate Software of Firmware Specific to A Particular Model of Set-

5   Top Box in A Cable Television System" filed on April 7, 2000 and owned by General Instrument Corporation of Horsham, Pennsylvania, the assignee of the present invention.

However, delivering messages to terminals such as the Bootloader terminal becomes problematic in large satellite or cable television systems with multiple

10   headends. In such a system, it may be desirable to send messages only to the set-top terminals associated with a particular headend. As such terminals can only receive broadcast messages, it may be impractical to send a broadcast message (i.e. a message to all terminals) when only those terminals associated with a particular headend are intended to receive the message.

15   It would be advantageous to provide methods and apparatus for delivering broadcast messages to only particular terminals associated with a particular headend. It would be particularly advantageous to provide a message filter to allow only selected terminals to receive a broadcast message. It would be further advantageous to provide a message envelope which encloses the broadcast message and directs the broadcast

20   message to a specific headend. It would be even further advantageous to strip the envelope from the broadcast message at the headend so that the broadcast message can then be forwarded to all the terminals associated with that headend.

The methods and systems of the present invention provide the foregoing and other advantages.

SUMMARY OF THE INVENTION

The present invention relates to message delivery in a network. In particular, broadcast messages may be transmitted for receipt by specific recipients in a network. The network has multiple interim processing points. A plurality of recipients (also

5   referred to herein as "clients" or "client devices") are associated with each interim processing point. A first processor at a message source is provided for generating a broadcast message and encasing the broadcast message in a message envelope. The message envelope associates the broadcast message with a specific interim processing point and directs the message envelope containing the broadcast message to the specific

10   interim processing point. A first transmitter at the message source is provided for transmitting the message envelope containing the broadcast message over the network to the specific interim processing point. A receiver at each interim processing point is provided for receiving the message envelope containing the broadcast message if the message envelope is associated with that specific interim processing point. A second

15   processor at each interim processing point is provided for stripping message envelopes associated therewith from the broadcast messages. A second transmitter is provided at each interim processing point for forwarding broadcast messages stripped at that processing point to recipients associated with the specific interim processing point.

The message source may comprise a national control for a television system

20   having multiple headends. The interim processing points may comprise television system headends and the recipients may comprise set-top terminals.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will hereinafter be described in conjunction with the appended drawing figures, wherein like numerals denote like elements, and:

FIGURE 1 is a block diagram of an exemplary embodiment of the invention;

FIGURE 2 illustrates the packaging ("encasing") of messages in accordance with an exemplary embodiment of the invention;

FIGURE 3 is a more detailed block diagram of an implementation of the invention; and

FIGURE 4 is a block diagram of a further exemplary embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The ensuing detailed description provides preferred exemplary embodiments only, and is not intended to limit the scope, applicability, or configuration of the invention. Rather, the detailed description of the preferred exemplary embodiments will

5 provide those skilled in the art with an enabling description for implementing a preferred embodiment of the invention. It should be understood that various changes may be made in the function and arrangement of elements without departing from the spirit and scope of the invention as set forth in the appended claims.

In an exemplary embodiment of the invention as shown in Figure 1, broadcast

10 messages are transmitted for receipt by specific recipients (clients) in a network generally designated 200. The network 200 has multiple interim processing points (e.g., 110A, . . . , 110N). A plurality of recipients are associated with each interim processing point. For example, Figure 1 shows interim processing point 110A as having recipients (e.g., clients 120A, 121A, . . . , and 150A) associated therewith. Interim processing point

15 110N is shown as having recipients 120N, 121N, . . . , and 150N. It should be appreciated that there may be any number of interim processing points in network 200, as well as any number of recipients associated with each interim processing point.

A broadcast message is generated at the message source 100. As shown in Figure 2, the broadcast message 20 is encased in a message envelope 10 for directing the

20 broadcast message 20 to a specific interim processing point. The message envelope 10 containing the broadcast message 20 is transmitted from the message source to the specific interim processing point. Once received at the specific interim processing point, the message envelope 10 is stripped from the broadcast message 20. The broadcast message 20 can then be forwarded from the specific interim processing point to

25 recipients associated with the specific interim processing point.

As shown in Figure 2, the message envelope 10 may include a header 25 containing an address for the specific interim processing point. In this manner, broadcast messages can be directed to specific interim processing points, and consequently to specific client devices. Thus, the invention allows broadcast messages

to be reformatted for selective distribution. This effectively changes the broadcast messages to directed messages, without any need to change the operation of upstream components which continue to operate as though such messages are really broadcast to all terminals, in the classic sense of a broadcast message.

5   Figure 3 shows a block diagram of the invention. For simplicity, only one interim processing point 110A and its associated recipients (120A, 121A, . . . , 150A) are shown. A first processor 205 at a message source 100 is provided for generating a broadcast message and encasing the broadcast message in a message envelope (as described in connection with Figure 2). The message envelope associates the broadcast

10   message with a specific interim processing point (in this example interim processing point 110A) and directs the message envelope containing the broadcast message to the specific interim processing point (e.g., 110A). A first transmitter 210 at the message source 100 is provided for transmitting the message envelope containing the broadcast message over the network 200 to the specific interim processing point (e.g., 110A). A

15   receiver 215 at each interim processing point is provided for receiving the message envelope containing the broadcast message if the message envelope is associated with that specific interim processing point. A second processor 220 at each interim processing point is provided for stripping message envelopes associated therewith from the broadcast messages. A second transmitter 225 is provided at each interim processing

20   point for forwarding broadcast messages stripped at that processing point to recipients (clients 120A, 121A, . . . , and 150A) associated with the specific interim processing point. The recipients (120A, 121A, . . . , and 150A) may have receivers (e.g., 230A, 231A, . . . , and 250A) for receiving the broadcast messages.

       The interim processing points 110A, . . . 110N may comprise network nodes

25   (e.g., cable television headends, network routers, and the like) and the recipients (e.g., clients 120A, 121A, . . . , 150A and clients 120N, 121N, . . . , 150N) may comprise client devices (e.g., personal computers, television set-top terminals, televisions, printers, Internet appliances, and the like).

In an alternate embodiment as shown in Figure 4, the message source may comprise a national control 500 for a television system generally designated 600 having multiple headends. The interim processing points may comprise television system headends (510A, . . . , 510N) and the recipients may comprise set-top terminals (520A,

5   521A, . . ., 550A and, 520A, 521A, . . . , 550N). The broadcast message (20 of Figure 2) may contain pre-configuration information for the set-top terminals. The pre-configuration information may allow the set-top terminals (e.g., 520A, 521A, . . ., 550A) to acquire configuration information, platform layer information, control channel information, application information, authorization information, and/or system

10   information. The television system 600 may be a satellite television system, a cable television system, or a combination satellite and cable television system. The message envelope may include a header containing the address for the specific headend.

The message envelope may be stripped from the broadcast message by a filter. The filter compares, for example, received header information (e.g., contained in header

15   25 of the broadcast message as shown in Figure 2) to predefined message envelope codes that are specific to the particular interim processing point associated with the filter. In this manner, the filter can identify message envelopes associated with that particular interim processing point and strip the message envelopes from the broadcast messages intended for the client devices associated with that particular interim

20   processing point. The filter may be implemented in the processor 220 located at each interim processing point. The filter may be easily implemented in software and/or firmware as will be apparent to those skilled in the art.

In a cable television system application as described in connection with Figure 4, the invention enables the efficient delivery of broadcast messages to simple terminals

25   that are configured to receive only broadcast messages. By encasing the broadcast message in a message envelope, the broadcast message can be directed to a specific headend for distribution to the set-top terminals associated with that headend. In this manner, receipt of the broadcast message can be limited to a specific population of the

set-top terminals in a television system. Moreover, the present invention enables national control of set-top terminal configuration, as illustrated in Figure 4.

5   It should now be appreciated that the present invention provides advantageous methods and systems for delivering broadcast messages in a network only to specific recipients by encasing the broadcast message in a message envelope, which can be addressed to a specific interim processing point so that the delivery of a broadcast message can be limited to only those recipients associated with that particular interim

10   processing point. Such methods and systems provide a way to advantageously address recipients, such as a simplified set-top terminal, which are only designed to receive broadcast messages.

Although the invention has been described in connection with various illustrated embodiments, numerous modifications and adaptations may be made thereto without

15   departing from the spirit and scope of the invention as set forth in the claims.